

THREE NEW SPECIES OF CASTOLUS AND A KEY TO THE
SPECIES (HEMIPTERA: REDUVIIDAE)

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ABSTRACT—*Castolus bicolor* n. sp., *C. lineatus* n. sp., and *C. pallidus* n. sp. are described and included in a key to the known species of this neotropical genus. *Castolus nigriventris* Breddin, whose type may be lost, is not considered in the key.

An undescribed species of *Castolus* was found among specimens of Reduviidae from Coco Solo, Panamá, sent to me by Dr. Dodge Engleman. More specimens of the same species were found among undetermined material in the U.S. National Museum (USNM), Washington, D.C. and at the American Museum of Natural History (AMNH). Dr. P. Wygodzinsky, from AMNH, loaned me other specimens that included two more new species also described below. The genus now includes 13 species.

Thanks to Dr. Per Inge Persson, from the Swedish Museum of Natural History, I had the opportunity to study Stål's types of *Castolus multicinctus* and *C. fuscoapicatus*. Both species are re-described below. The type of *C. nigriventris* Breddin seems to be lost according to Dr. Gunter Morge who has devoted several years to study Breddin's types. At least the type is not in the collection of the German Entomological Institute at Berlin. The key given below does not include this mostly black species as Breddin's description is insufficient. Dr. R. C. Froeschner, of the USNM, kindly loaned me specimens of *C. spissicornis*.

The types of the new species are deposited in the USNM, AMNH or in my collection (JMC). In the measurements that follow 12.5 micrometer units are equivalent to 1 mm. The length of the specimens is given to the tip of wings. This paper is in part possible thanks to NSF Grant GB-7382.

Castolus Stål, 1858

Head: Slightly shorter than pronotum. All antennal segments linear, 3rd segment thickened in *spissicornis*, 1st shorter than head and pronotum together; jugum inconspicuous, not produced; ocelli slightly or well elevated above level of head, sometimes whole ocellar area elevated; 1st segment of beak longer than 2nd, reaching beyond anterior margin of eye, 3rd the shortest; subantennal spine very short, seldom absent; postocular region nearly 2× as long as antecular. Pronotum with anterior lobe somewhat inflated, posterior lobe not inflated and not produced over scutellum; unarmed on disc of both lobes; posterior lobe with humeral angle sometimes spined, with slight or no discal elevation; posterior margin straight and horizontal over scutellum, not even slightly produced each side of scutellum; mesopleuron without plica, in some species with an anterior batch of scalelike pilosity; scutellum triangular, with

a Y-shaped carina. Postscutellum shortly produced beyond scutellum. Legs: Femora unspined, linear, usually of uniform thickness throughout, slightly thicker than tibiae, apically not bispinous; forefemur slightly longer than hind; tibiae straight with rounded apical sensory pad that extends slightly beyond insertion of tarsi. Anterior acetabulum open. Forefemur ventrally with dense mat of sensory hairs more abundant basally and diminishing both in area and length to about midlength of segment and thence almost bare to apex. Midfemur ventrally with scarcer hairs. Hindfemur without sensory hairs. Foretibia ventrally with sensory hairs increasing in area from base toward apex; midtibia with sensory pilosity much less abundant, and hindtibia without these. Trochanters unarmed; anterior with a dense mat, mid with scarce, and posterior without sensory hairs. Connexival segments not spined on apical angle, slightly angularly produced in some species. Pterostigma of forewing surpassing apex of abdomen; discal cell quadrangular, longer than wide, wider basally than apically. Posterior margin of hypopygium with hairy elevation or patch each side of median spine; median spine long or short, cylindrical or flattened, flattened laterally or dorsoventrally, straight or slightly curved. Claspers short, not reaching to and shorter or longer than median spine of the hypopygium, somewhat hairy apically, very slightly expanding toward apex, straight or slightly curved. Aedeagus quite simple; articulatory apparatus with anterior bridge; with simple dorsal shield (fig. 26). Eighth tergum of female vertical, as in fig. 13 and 17. Neotropical.

In Stål's key (1872) *Castolus* is closest to *Graptocleptes* as they share the following characteristics: Jugum not produced or prominent, unarmed penultimate segment and disc of posterior lobe of pronotum, and straight profemur. Their aedeagi and claspers are quite similar. They differ as follows: *Graptocleptes* has the subantennal spine short and curved forward, the membrane of the forewing wider than pronotum posteriorly, the margin of the hypopygium produced but hair on each side of the median spine, short, irregularly distributed and not on a separate structure, and the species are slender and somewhat mimic wasps. *Castolus* has the subantennal spine very short and vertical, the membrane narrower than the pronotum, with hairy patch on each side of the median spine of the margin of the hypopygium, and the species are broader, more robust, and do not mimic wasps. The aedeagi of species of *Castolus* are very close, the articulatory apparatus showing slight differences. The eighth terga of the females are also very similar. The best characters to separate the species are the abundant color differences, the spines and shape of the pronotum, and the marked differences in the details of the margin of the hypopygium.

KEY TO THE SPECIES OF CASTOLUS

- | | |
|--|---|
| 1. Humeral angle of pronotum with rather long spine | 2 |
| — Humeral angle of pronotum unarmed, with very short tooth or sub-
angularly shortly produced | 5 |

- 2. Head, legs, and anterior lobe and anterior 1/2 of posterior lobe of pronotum black (fig. 12) *bicolor* new species
- Head straw colored or only with ocellar area black; pronotum mostly light colored; legs stramineous 3
- 3. Head, pronotum, and forewings straw colored; anterior femora rather stout; legs pale, annulate with fuscous *subinermis* (Stål)
- Head with ocellar area black; pronotum or base of forewing ornamented 4
- 4. Anterior lobe of pronotum with transverse black band anteriorly and posteriorly, posterior lobe orange (fig. 1); femora with 2 apical dark annuli and fine longitudinal dark lines *lineatus* new species
- Pronotum uniformly colored (fig. 6); femora with 1 apical annulus *pallidus* new species
- 5. Humeral angle of pronotum with short tooth (fig. 3) 6
- Humeral angle of pronotum unarmed or slightly subangularly dilated 7
- 6. Ocelli large, elevated (fig. 2); pronotum brown (fig. 3) ... *ferox* (Banks)
- Ocelli small, slightly elevated (fig. 4); pronotum stramineous with 3 black spots on posterior lobe (fig. 5) *trinotatus* (Stål)
- 7. Posterior and anterior lobe of pronotum concolorous, brownish or blackish brown; head reddish or brownish 8
- Anterior lobe of pronotum much lighter than posterior, posterior with extensive black or brown area; head black, straw colored or reddish 9
- 8. Pronotum and forewing dark brown; posterior lobe of pronotum with basal and lateral margins reddish; scutellum reddish; hindmargin of pronotum as in fig. 16 *rufomarginatus* Champion
- Pronotum and scutellum brownish; clavus and corium reddish; hindmargin of pronotum as in fig. 21 *spissicornis* (Stål)
- 9. Head black 10
- Head reddish, straw colored with black ocellar area or at least neck straw colored 11
- 10. Discal brown area on posterior lobe not reaching lateral margins; forewing mostly dark brown; fig. 7 *multicinctus* Stål
- Brown area on posterior lobe reaching lateral margins; forewing yellowish white with small brownish areas basally, near base of membrane, and apically on membrane; fig. 9 *fuscoapicatus* (Stål)
- 11. Head and legs reddish; clavus and most of corium whitish, pronotum as in fig. 10 *plagiaticollis* Stål
- Head straw colored with ocellar area black or sometimes vertex also more or less black, at least neck straw colored; 1st 2 legs brownish; forewing stramineous anteriorly, black transversely between scutellum and base of membrane, and reddish on both sides of membrane; pronotum as in fig. 11 *tricolor* Champion

Castolus bicolor Maldonado Capriles, new species

fig. 12, 19

Male (fig. 17): Head black; small inconspicuous ivory white area on base of neck above, on base of tylus, and behind antenna including the subantennal spine. Beak black. Antenna: First segment black with 2 long yellowish-white spots near midlength; 2nd black; 3rd and 4th dark gray. From antennae to interocular

depression thickly covered with whitish decumbent thick pilosity. Pronotum: Anterior lobe dorsally and laterally and collar black; posterior lobe with anterior $\frac{1}{2}$, except medianly, black; posterior $\frac{1}{2}$ and anterior $\frac{1}{2}$ of posterior lobe medianly orange red. Pleurae and thoracic sterna black. Scutellum black with pale orange lateral margins. Forewing: Clavus and corium pale orange; membrane hyaline. Legs black; femora grayish white throughout most of anterior face. Abdominal sterna blackish brown, almost black; 2-5 sterna medianly conspicuously ivory white along anterior margin, laterally less so below level of spiracles; margin of connexivum broadly ivory white to penultimate segment; last tergum thinly margined with ivory white. Apex of hypopygeal spine ivory white. Pronotum laterally, pleurae, thoracic sterna, and basal $\frac{1}{2}$ of abdominal sterna thickly covered with white, short, decumbent, thick pilosity. Legs with moderately abundant vertical and semidecumbent long fine whitish pilosity. Scutellum long pilose apically.

Head: Length 27, width across eyes 16, interocular space 9. Antennal segments: 43:13:46:20. Beak: 12:10:?. Pronotum: Length 34, across shoulders 15, across widest part of anterior lobe 21, across humeral angle of posterior lobe 41. Head with vertex slightly convex. Pronotum: Collar slightly produced laterally; individual lobes of anterior lobe globose, smooth; depression between lobes deep; posterior lobe with surface very finely and inconspicuously pitted, humeral angle produced in a long spine. Femora from above: Anterior thickest basally, slightly tapering to apex, the thickest; middle almost parallel-sided to before apex where it narrows and then slightly widens apically, thinner basally than fore (3:5); hind slightly thicker basally and apically, straight, slightly thinner than midfemur; lengths of femora: 43:38:49, the last reaching to apex of 5th abdominal segment. Tibiae straight. Length 12 mm.

Upper margin of hypopygium with long, straight, vertical, slightly club-shaped spine; hairy area well defined, elevated and extensive; a median elongate depression on lower surface of hypopygium (fig. 19).

Holotype: δ , from Trinidad, Arima Valley, 800-1200 ft., Feb. 1966, J. G. Rozen collector, in AMNH. Easily distinguished by the black head, legs, and anterior part of pronotum. A female in my collection, from Trinidad, lacking the extensive black areas of the pronotum but otherwise similar to the described male could be the female of this species. It also has the batch of scale-like hairs behind the antenna a character that is not found in the other species.

Castolus fuscoapicatus (Stål, 1860)

fig. 9

Female (fig. 9): Head above blackish brown, with short dashes of yellow between antennae, ocelli, and along internal margin of eye; laterally blackish brown behind eye and yellowish in front; below yellowish. Beak: First segment shiny brown, 2nd brown basally and remaining part light brown, 3rd light brown. Antenna: First and 2nd segment blackish brown, 3rd blackish brown basally and then fading to brown at apex; 4th brown. Subantennal spine yellowish, black at base. Pronotum: Anterior lobe dorsally brownish yellow, anterior angle blackish brown, laterally brownish yellow with blackish longitudinal stripe from anterior angle to posterior lobe; posterior lobe dorsally yellowish

contiguous to anterior lobe and more extensively so along median depression and narrowly along posterior margin, remaining dorsal parts and laterally blackish brown. Thoracic sterna and pleura light brownish yellow; with a brown or blackish-brown area ventrally in front of mesocoxa and laterally above meso- and metacoxa. Anterior coxa brownish yellow, laterally with a small brownish area; meso- and metacoxa shiny brown. Anterior femur brownish yellow, with a midlength and preapical brown annulus; meso- and metafemur dark brown, with postbasal and midlength brownish-yellow annuli. Tibiae and tarsi dark brown. Scutellum brownish yellow, a shade lighter than anterior lobe. Forewing: Clavus yellowish white, brown basally; corium yellowish white, brown basally and at apical angle; membrane mostly hyaline, brownish along caudal vein (M) of last discal cell and along anal vein. Abdominal sterna mostly brownish yellow, 1st sternum slightly darker; laterally above on basal margin and extending close to posterior margin a semicircular brown spot that includes spiracle. Connexivum brownish yellow; 3rd, 4th, and 5th segments orange on basal $\frac{2}{3}$. Head and pronotum with moderate abundant fine short appressed grayish pilosity; antenna very short pilose; abdomen along lateral margins with moderately long vertical pilosity.

Head: Length 28, width across eyes 16.5, interocular space 9. Antennal segments 45:14:39:19. Beak 12:10:7. Pronotum: Length along median line 30, width across shoulders 14, across widest part of anterior lobe 17.2, across humeral angle of posterior lobe 33. Antennal socket closer to eye than to apex of tylus (3:6); subantennal spine 3. Vertex convex; ocelli well elevated. Anterior angle of pronotum round. Individual lobes of anterior lobe smooth, globose; disc of posterior lobe smooth, medianly broadly depressed from anterior margin to before apex; humeral angles roundly elevated, not produced laterally; posterior margin straight above scutellum. Coxae glabrous. Forefemur straight thickest basally and slightly swollen preapically; other 2 of equal thickness throughout; lengths 44:37:54; 1st at midlength the thickest (4.5:3.5:3.5). Foretibia straight, slightly thickening apically. Midtibia shaped as foretibia, both with moderately abundant semivertical fine long pilosity that does not exceed thickness of segment. Hindtibia with fine pilosity longer than thickness of segment. Length 12 mm.

Type from Brazil. Closest to *C. multinctus*, they can be separated by the characters in the key.

Castolus lineatus Maldonado Capriles, new species
fig. 1, 14, 15

Male: Head and beak cream yellow; interocellar area black. Antenna: First segment with 3 alternating straw colored and 3 black bands, bands somewhat fused along frontal margin; 2nd pale straw colored, apex black; 3rd brown basally fading to light brown apically; 4th light brown. Pronotum (fig. 1) with a narrow black band behind collar that extends down along side of pronotum; similar band between anterior and posterior lobes also extending along sides of pronotum; anterior lobe and collar pale straw colored; posterior lobe pale straw colored anteriorly, posteriorly orange red; hindmargin narrowly pale. Mesopleuron anteriorly blackish; remaining parts of thorax straw colored. Scutellum with discal depression black or orange; margin pale straw colored.

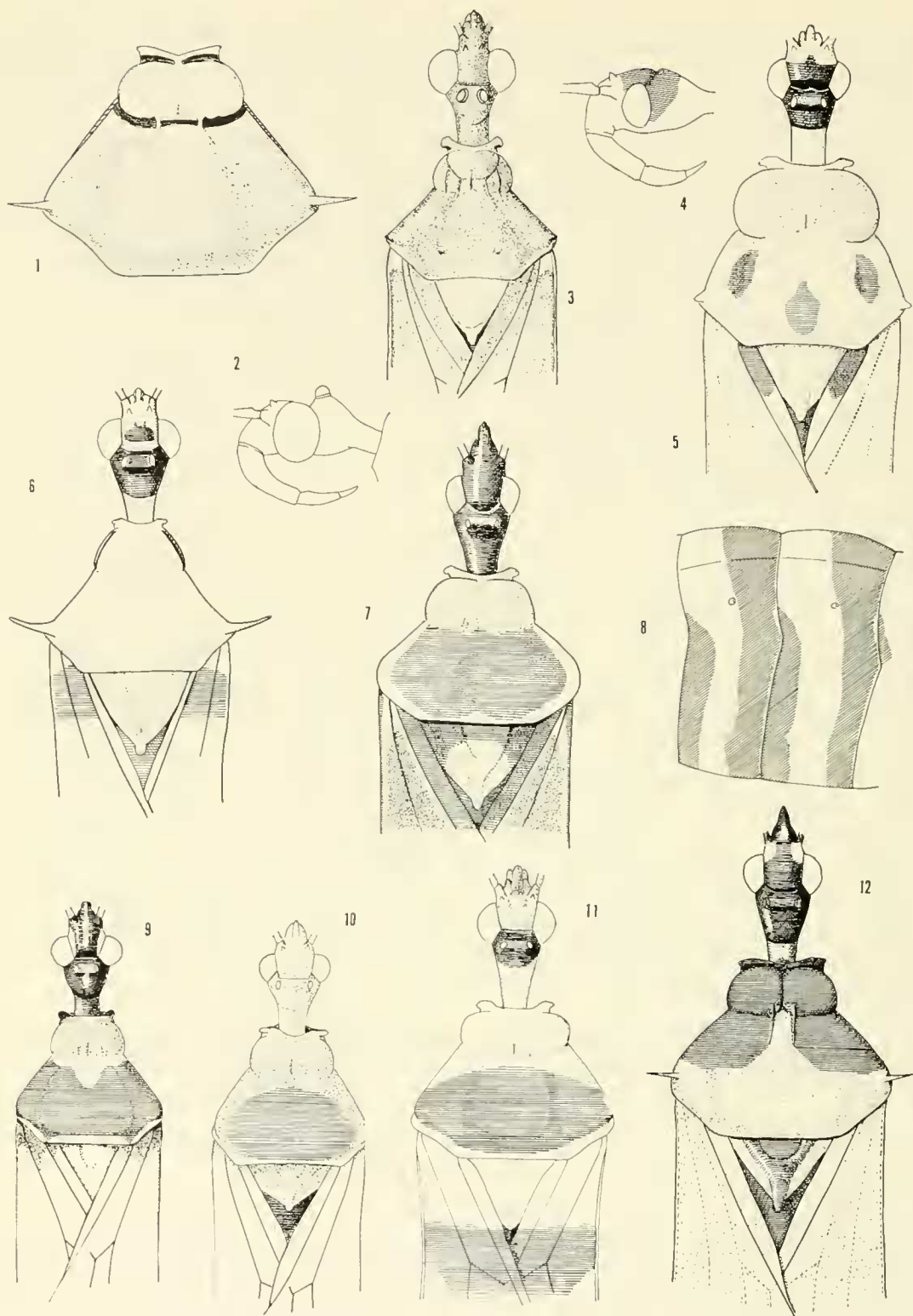


Fig. 1. *Castolus lineatus*, pronotum, dorsal. Fig. 2-3. *C. ferox*. 2, head, lateral. 3, anterior half, dorsal. Fig. 4-5. *C. trinotatus*. 4, head, lateral, 5, anterior half, dorsal. Fig. 6. *C. pallidus*, anterior half, dorsal. Fig. 7-8. *C. multicinctus*. 7, anterior half, dorsal. 8, abdominal sterna III and IV, lateral. Fig. 9. *C. fuscoapicatus*, anterior half, dorsal. Fig. 10. *C. plagiaticollis*, anterior half, dorsal. Fig. 11. *C. tricolor*, anterior half, dorsal. Fig. 12. *C. bicolor*, anterior half, dorsal.

Legs: Femora pale straw colored; with blackish annulus after midlength; apically on anterior and posterior face blackish; with interrupted thin longitudinal blackish-brown lines extending from base to apex; tibiae pale straw colored, apex brownish; with incomplete blackish postbasal annuli and longitudinal thin basal lines. Forewings: Clavus and corium very pale orange, near humeral angle with a blackish-brown area; membrane hyaline. First 5 abdominal sternae pale straw colored medially turning into pale orange towards lateral margins; connexival margin and last 2 abdominal segments very pale orange; sternae 2-5 blackish along apical margin on each side of abdomen (fig. 14). Head and antennae mostly glabrous; pronotum and forewings with scarce vertical pilosity; legs with moderately abundant long vertical and semidecumbent pale hairs, more abundant towards apex of tibiae. Black stripe of mesopleuron with short, appressed, thick, white pilosity.

Head: Length 29, width across eyes 19, interocular space 9. Antennal segments: 54, 17, 52, 16. Beak: 14, 12, 5. Pronotum: Length 36, across shoulders 15.5, across widest part of anterior lobe 22, across humeral angle 45. Subantennal spine short. Anterior angle of pronotum produced lateral as short spine; individual lobes of anterior lobe globose, smooth, depression between lobes deep only posteriorly; posterior lobe somewhat elevated on disc, inconspicuously and shallowly finely pitted, with 2 very slight elevations behind on disc. Last 2 segments of connexivum very shortly angularly produced. Upper margin of hypopygium as in fig. 15; spine long, slender; on lateral aspect long S-shaped, apex hooklike. Length 14.5 mm.

Female: Coloration and pilosity mostly as in male; black lines slightly thicker, more conspicuous; anterior lobe of pronotum straw colored; dark areas on humeral angles of forewing smaller. Head: Length 33, width across eyes 19, interocular space 9. Antennal segments: 57, 19, 59, 19. Beak: 19, 16, 7. Pronotum: Length 40, width across shoulders 16, width across widest part of anterior lobe 25, across humeral angles 49. Thorax shaped as in male. Abdomen wider than in male; connexivum exposed as seen from above, all connexival segments shortly angularly produced.

Holotype: ♂, Barro Colorado, Canal Zone, Panamá, Dec. 30, 1940, K. W. Cooper collector, in AMNH. Allotype ♀, same locality, April 21-22, 1962, H. Ruckes collector, in AMNH.

Paratypes: 1♂ from Colombia, 1♂ from Costa Rica in AMNH, and 1♀ from Barro Colorado, C. Z., 1♀ from Colombia in JMC.

In the paratypes the discal depression of the scutellum is black, orange, or straw colored and the size of the black areas on the base of the forewings varies. The coloration of the pronotum is quite constant. In some specimens the hindtibia is brownish basally instead of straw colored. Closest to *C. pallidus*, they can be separated by the characters in the key.

Castolus multinctus Stål, 1872

fig. 7, 8

Female: Head above and laterally, beak and 1st segment of antenna polished blackish brown; from lower margin of eye diagonally to ventral side of neck

with an orange stripe; 2nd to 4th segments of antenna dark brown. Pronotum (fig. 7): Anterior lobe dorsally and laterally to base of acetabula orange; posterior lobe dorsally dark brown with ivory lateral and caudal margins; lower lateral margin of pronotum dark brown along both anterior and posterior lobes. Meso- and metapleura, coxae, and legs polished very dark brown, a shade paler than head. Forewing: Clavus brown; corium lighter brown to before R vein, area between R and C ivory white, costa brown, membrane hyaline. Abdomen ventrally with a zebra-like ornamentation (fig. 8). First visible abdominal sternum blackish, 2nd to 5th sterna black basally to level of spiracles, medianly ivory white to level of connexival segments, and apically again blackish to connexival segment; last sternum orange medianly, followed by an irregular brown area, and then with the same black and ivory pattern of preceding sterna. Genital segments orange. Connexival segments, above and below ivory white on basal $\frac{1}{2}$, blackish on apical $\frac{1}{2}$. Abdominal terga blackish brown, apical margin narrowly yellowish, white area of connexival segments shortly extending into terga at about midlength of lateral margin of each tergum. Body above, except membrane, covered with moderately abundant fine short, semidecumbent brown pilosity; antenna very short pilose.

Head: Length 30, width across eyes 17.5; interocular space 10. Antennal segments: 35, 16, 36, 16. Beak 15, 17, 6. Pronotum: Length along median line 34; across shoulder 17, across widest part of anterior lobe 25, across humeral angles of posterior lobe 43. Antennal socket closer to eye than to apex of tylus (4:10), no subantennal spine; vertex roundly convex; ocelli slightly elevated. Anterior angle of pronotum moderately produced laterad as blunt spines; individual lobes of anterior lobe globose, smooth; disc of posterior lobe slightly elevated, inconspicuously finely and shallowly pitted, with a small discal depression, humeral angle rounded. Coxae moderately pilose. Femora, from above, constricted after midlength and again before apex; lengths 47:42:52; 1st the thickest (7:5:4); last reaching to base of 5th abdominal segment. Foretibia straight, slightly thickening apically; midtibia and hindtibia straight; all with scarce long fine vertical hairs. Length 14.5 mm.

Type from Bogotá, Colombia. Closest to *C. fuscoapicatus*.

Castolus pallidus Maldonado Capriles, new species

fig. 6, 17, 18

Male (fig. 6): Mostly fuscous or straw colored; with black as follows: Vertex with rectangular spot on disc between eyes, ocellar area from behind eyes to base of neck, hooked stripe laterally on anterior lobe of pronotum, apex of femora, anteriorly on meso- and metapleura, postbasally on clavus and corium, and posterior margin of 1st 5 abdominal sterna. Antenna mostly fuscous or light brown; 1st segment blackish brown apically and 2 inconspicuous brownish annuli at about midlength, 2nd segment shortly blackish brown apically, 3rd brown basally, 4th light brown. Scutellum orange.

Head: Length 29, width across eyes 19, interocular space 9. Antennal segments 60:20:75:21; apex of antennal socket closer to eye than to apex of tylus (3:5). Beak 17:14:5. Pronotum: Length 32, width across anterior angles 15, across widest part of anterior lobe 20, across humeral angles 39; spine at humeral angle long, horizontal, 8; anterior angle of pronotum pointing laterad as conical

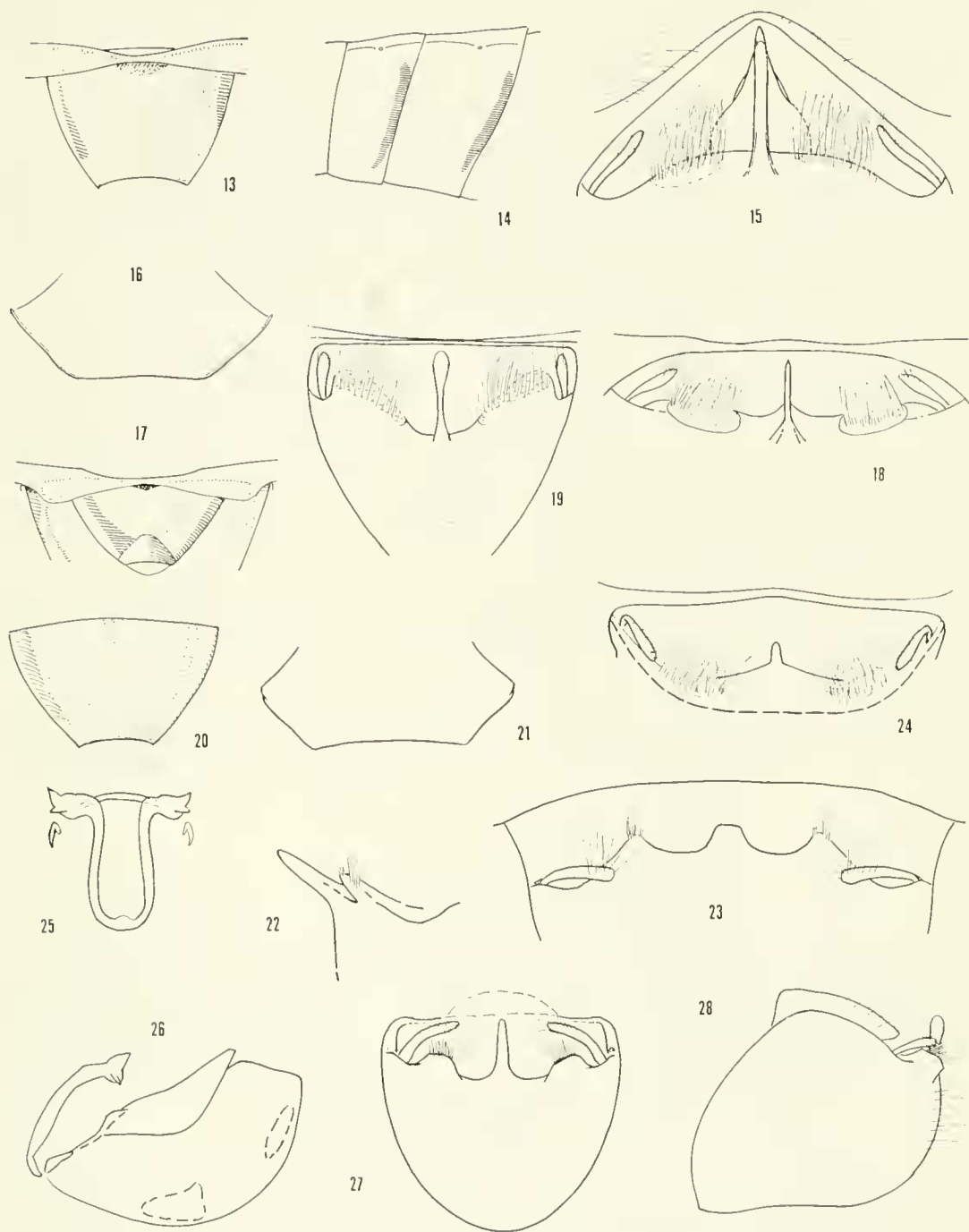


Fig. 13. *Castolus ferox*, eighth tergum, ♀, caudal. Fig. 14-15. *C. lineatus*. 14, abdominal sterna, III and IV, lateral. 15, margin of hypopygium. Fig. 16. *C. rufomarginatus*, margins of posterior lobe of pronotum. Fig. 17-18. *C. pallidus*. 17, eighth tergum, ♀, caudal. 18, margin of hypopygium. Fig. 19. *C. bicolor*, margin of hypopygium. Fig. 20-23. *C. spissicornis*. 20, eighth tergum, ♀. 21, posterior lobe of pronotum. 22, margin of hypopygium, lateral. 23, margin of hypopygium, caudal. Fig. 24. *C. trinotatus*, margin of hypopygium. Fig. 25-28. *C. plagiaticollis*. 25, articulatory apparatus of aedeagus. 26, aedeagus, lateral. 27, hypopygium, caudal. 28, hypopygium, lateral.

spines. Individual lobes of anterior lobe not globose, along posterior margin with 2 or 3 inconspicuous ridges; posterior lobe very finely pitted, disc flattened and posteriorly with 1 + 1 small conical elevations. Coxa glabrous. Femora strongly constricted before apex; forefemur thickest basally and thence tapering to apical constriction; mid- and hindfemur of almost same thickness throughout; lengths 56:45:59; first at midlength the thickest (6:4.5:4). Foretibia straight, midtibia of same thickness throughout, both tibiae with moderately abundant semivertical fine long pilosity that does not exceed thickness of segment. Hindtibia straight, fine semivertical pilosity longer than thickness of segment. Upper margin of hypopygium with patch of hairs on a well-defined, oval base; spine straight, vertical, flattened laterally (fig. 18). Length 14–16 mm.

Female: Coloration as in male. Head: Length 34, width across eyes 19, interocular space 10. Antennal segments: 61, 21, 65, ?. Beak: 19, 16, 5. Pronotum: Length 42, width across shoulders 16, width across widest part of anterior lobe 23, across humeral angles 48. Thorax shaped as in male. Abdomen wider than in male, connexivum exposed, all connexival segments shortly angularly produced. Apical margin of 7th and shape of 8th tergum (fig. 18) very much as in *lineatus*. Length 17 mm.

Holotype: ♂, Coco Solo Hospital, C. Z., at light, 20 June, 1972, D. Engleman collector, in the USNM, Cat. No. 73531. Allotype: ♀, same locality, 8 May 1972, D. Engleman collector, in the USNM. Paratypes: 7, specimens of both sexes, Barro Colorado Island, C. Z., Apr. 1962, H. Ruckes collector, in AMNH; 2 from Coco Solo Hospital and one from Barro Colorado, in JMC, 13 from Barro Colorado in the USNM.

This species is closest to *C. lineatus*.

Castolus ferox (Banks, 1910)

fig. 2, 3, 13

This North American species is mostly dark brown above and slightly lighter beneath. Forefemora darkest and all have 2 pre-apical, dark-brown annuli. Ocelli well elevated. Male lighter than female. Length, male 11 mm, female 16 mm. Specimens at hand from Arizona; reported from Texas by Elkins.

Castolus plagiaticollis Stål, 1858

fig. 10, 25–28

Head, anterior lobe of pronotum and unbanded femora brownish; tibiae dark brown. Hindmargin of posterior lobe of thorax ivory white and discally blackish brown (fig. 10). Clavus and most of corium yellowish, membrane and apex of corium dark brown. Abdomen yellowish or light brownish, narrowly transversely banded with brownish or reddish brown at sternal sutures. Male genitalia as in fig. 25–28. Length, male 11–12 mm, female 14–15 mm. Recorded from Mexico, Guatemala, and Panamá.

Castolus rufomarginatus Champion, 1899

fig. 16

Head, margins of pronotum, most of scutellum and thorax, and abdomen ventrally reddish. Pronotum above, forewings, and legs brown. Posterior margin

of pronotum of female as in fig. 16. Female 17 mm. Material at hand from Caracas, Venezuela; described from Mexico.

Castolus spissicornis (Stål, 1860)

fig. 20-23

Male: Head reddish brown, antenna polished blackish brown; pronotum above dark reddish brown, somewhat deeper anteriorly, posterior margin narrowly reddish. Scutellum reddish, with discal depression blackish. Forewing with clavus and corium dark red, with conspicuous abundant decumbent grayish pilosity and irregularly dotted with rounded glabrous areas. Pronotum laterally lighter than dorsally, meso- and metapleura reddish, abdomen ventrally reddish with many irregularly distributed dark red and blackish spots. Connexival segments with blackish-red margin. Abundant short decumbent pilosity all over; thoracic sterna densely white pilose. Femora brownish, tibiae dark reddish brown. Third antennal segment thickened. Posterior margin of pronotum as in fig. 21. Margin of hypopygium as in fig. 21 and 23. Length 14-15 mm.

Female: Lighter than male. Second to 5th connexival segments reddish on basal $\frac{1}{2}$, blackish on apical. Third antennal segment not thickened. VIII tergum of female as in fig. 20, thickly covered with white decumbent hairs. Length 18 mm. Specimens from Rio de Janeiro, identified by H. G. Barber, in the USNM.

Castolus subinermis (Stål, 1862)

I have not seen this species. Described from Mexico; recorded from Arizona.

Castolus tricolor Champion, 1899

fig. 11

Head blackish brown with small yellow areas in front, between antennae, and above on neck. Anterior lobe, hindmargin of posterior lobe, base of forewings to level of apex of scutellum, hindfemur to before apex, thorax ventrally, and abdominal sterna straw colored. Posterior lobe mostly blackish brown (fig. 11). Anterior and posterior legs, apex of hindfemur, and posterior tibia brown. Forewing as described in key. Abdomen transversely banded with dark brown along sutures of sterna. The yellow, brown, and red of forewings explain the trivial name of the species and identify it. Female: Length 14-15 mm.

Recorded from Mexico, Belize, Guatemala, and Panamá. From Costa Rica in JMC, no males at hand.

Castolus trinotatus (Stål, 1866)

fig. 4, 5, 24

Male: Head, anterior lobe of pronotum, margins of posterior lobe of pronotum, clavus, corium, hind legs, and thorax and abdomen ventrally straw colored. Posterior lobe yellowish white discally. Thorax laterally with 2 large dark-brown spots. Blackish areas on head, thorax, and clavus as in fig. 4 and 5. Front and hind legs light brownish, slightly darker than hind legs. Abdominal sterna posteriorly transversely and narrowly banded with red. Posterior margin of hypopygium as in fig. 24; spine and hairy patches receding from margin, contrary to the other species in which they are marginal. Length 14-15 mm.

Material at hand and in the USNM from Honduras, Nicaragua, and Mexico, the latter the type-locality.

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BOOK REVIEW

Urban Entomology. 1975. By Walter Ebeling. 695 pp., 391 figs., 8 col. pls. Distributed by: Publications, Division of Agricultural Sciences, University of California, 1422 S. 10th St., Richmond, Calif. 94804. Price, \$27.50.

The title of this fine book is aptly chosen because of the rapid shift of people to city and suburban living. The coverage is broad enough to include not only traditional structural pests but also pests which may annoy picnickers, campers and fishermen. The problems of people who mistakenly think that they are parasitized by insects are even discussed. Insects attacking garden vegetables and shrubs are omitted, but pests of house plants are included. Subjects not usually regarded as entomological, such as vertebrates (rats, snakes, etc.) often encountered by the outdoor person, likewise are represented.

Background on a wide variety of organized entomological efforts in the United States—the National Pest Control Association, the pest control industry as a whole, leading entomological societies, state and federal agencies whose work is related to consumers and their needs—to name a few, is supplied. Information on basic entomology sufficient to place pest species in perspective is also given, and the references mentioned throughout the text, assembled in a terminal bibliography of 50 pages, will be very useful to teachers and others accessible to libraries. There is a full treatment of pesticides and equipment for using them.

Dr. Walter Ebeling, a professor of entomology at the University of California, Los Angeles, has had a long and productive experience in the whole field of pest problems. A 1959 book, "Subtropical Fruit Pests," and numerous reports on termites, cockroaches and other domestic pests are evidence of his background.

It is safe to predict that this book will be very successful.

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